

# Appendix 11.5 Baseline Noise Survey Equipment Calibration Certificates

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# Microphone Calibration Certificate

19 March 2012

01dB; MCE212

Serial No: 142646

Nominal

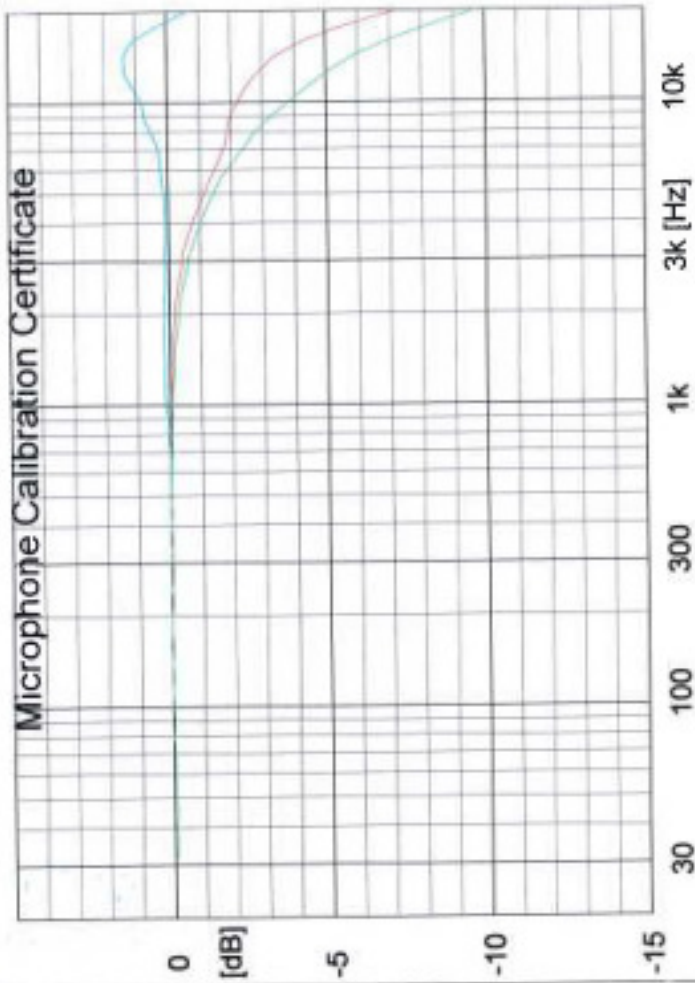
Capacitance: 14.8 pF

Polarization Voltage: 0V

Free field response

Diffuse response

Actuator response



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## Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)  
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0601

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Certificate Number: 00771/4

Date of Issue: 21 March 2012

### SET-UP INFORMATION

The instrument version was Master 01 V1.404. The tests were performed with the pre-amplifier connected, via the supplied microphone extension cable, to the instrument's microphone input socket. The reference range, reference SPL, primary indicator range, pulse range and linearity range as specified by the manufacturer have been used. The instrument was adjusted to read 93.7 dB (A) in response to the associated calibrator. This reading was obtained from the calibration certificate of the calibrator, 00771/3 and information in the manufacturer's instruction manual, when the instrument is fitted with the supplied windshield.

### MEASUREMENTS

The levels of self-generated noise were:

**A: 10.6 dB\***  
**B: 9.5 dB\***  
**C: 11.1 dB\***  
**Z: 15.5 dB\***

\*Under-range indicated on instrument display

At the end of the tests the indication of the sound level meter in response to the associated sound calibrator was 93.6 dB (A) which corresponds to the following level at 101.325 kPa:

**Sound Pressure Level 93.6 dB (A)**

**This reading should be used henceforth to set up the sound level meter for field use.**

THE SOUND LEVEL METER WAS VERIFIED ACCORDING TO THE PROCEDURE GIVEN IN BS7580: Part 1 1997 WITH THE FOLLOWING EXCEPTIONS:

The microphone corrections applied as specified in BS 7580: Part 1: 1997 were obtained from a frequency response measurement by this Laboratory using the electrostatic actuator method. The response in isolation is not covered by our UKAS accreditation.

A stricter test than that specified in 5.5.10 and 5.5.11 of BS 7580 has been used by not applying the low level signal.

### STATEMENT OF RESULT:

THE SOUND LEVEL METER CONFORMS TO BS7580: PART1 1997

Instruments used in the verification procedure were traceable to National Standards. The method of acoustic calibration employed a standard sound pressure calibrator for the 1 kHz test whilst the tests at 125 Hz and 8 kHz were performed by the electrostatic actuator method. The uncertainty of the Laboratory's 1 kHz calibrator was  $\pm 0.10$  dB. The uncertainty of the standard calibrator is not included in the applied tolerances. It is assumed that the sound level meter was manufactured in accordance with BSEN60651: 1994 Type 1, and BSEN60804: 1994 Type 1.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

# Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)  
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801  
Date of Issue: 9 May 2012  
Certificate Number: 00789/4



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APPROVED SIGNATORIES

Claire Lomax [✓]  
Gary Phillips [ ]

Andy Moorhouse [ ]  
David Waddington [ ]



## acoustic calibration laboratory

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### PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	WSP Acoustics The Victoria 150-182 The Quays Salford M50 3SP
FOR THE ATTENTION OF:	Nick Adamson
PERIODIC TEST DATE:	8 <sup>th</sup> and 9 <sup>th</sup> May 2012
TEST PROCEDURE:	CTP12 (Laboratory Manual)

#### Sound Level Meter Details

Manufacturer	Rion
Model	NL-52
Serial number	00510144
Extension cable/other info	
Class	1
Firmware	version 1.2
NX42EX	version 1.3

Associated Items	Microphone	Preamplifier	Calibrator
Manu	Rion	Rion	-
Model	UC-59	NH-25	-
Serial Number	02849	10137	-
Calibrator Adaptor	-	-	-

Test Engineer (initial):

Name: Gary Phillips

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Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

Manufacturer's instruction manuals were marked as follows: NL-42/NL-52 Technical Notes (No. 55750 11-03) and NL42/NL-52 Instruction Manual (No. 55530 11-03).

Adjustment data used to adjust the sound levels indicated in response to the application of an electrostatic actuator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer's instruction manuals referred to in this certificate and from information provided by the manufacturer.

The sound level meter calibration check frequency is 1000 Hz, the reference level is 94 dB. As this instrument only has a single range, this range is the reference level range. The instrument was calibrated without a windshield. Consult manufacturer's instructions if using a windshield.

The environmental conditions in the laboratory at the start of the test were:  
Static pressure 99.905 kPa, air temperature 22.4 °C, relative humidity 42.5 %.

The initial response of the instrument to application of the associated sound calibrator was 94.2 dB (A). The instrument was then adjusted to indicate 93.9 dB (A). This indication was obtained from the calibration certificate of the calibrator, 00545/1 and information in the manufacturer's instruction manuals specified in this certificate, when the instrument is configured as follows, Windscreen Correction: WS None, Diffuse Sound field correction: OFF.

With the microphone installed the level of self-generated noise on the most-sensitive level range was:

**A: 16.2 dB\***

\* Under-range indicated on instrument display

With the microphone replaced by an electrical input device with a capacitance of 14.6 pF, the levels of self-generated noise on the most-sensitive level range were:

**A: 11.0 dB\***

**C: 15.4 dB\***

**Z: 20.7 dB\***

\* Under-range indicated on instrument display

The environmental conditions in the laboratory at the end of the test were:  
Static pressure 100.256 kPa, air temperature 22.3 °C, relative humidity 41.8 %.

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The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

The uncertainty of measurement of the adjustment data given in the instruction manual is the total expanded uncertainty of the instrument, including microphone, instrument case and windscreen. The uncertainty of measurement of the adjustment data for the microphone alone, provided by the manufacturer of the microphone, has been used. No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual for the instrument case, was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of measurement of the adjustment data for the instrument case has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the sound level meter may not meet the requirements of IEC 61672-1:2002.

The microphone corrections applied as specified in 12.6 of IEC 61672-3:2006 were obtained from a frequency response measured by this Laboratory using the electrostatic actuator method. This response in isolation is not covered by our UKAS accreditation.

Instruments used in the verification procedure were traceable to National Standards. The electrostatic actuator method was employed in the acoustical tests of a frequency weighting at the 1 kHz, 125 Hz and 4 kHz frequencies.

*The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.*

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